

SECTION 2 – WATER DEMANDS

Demand for water in the Authority's service area is divided into two basic categories: municipal and industrial (M&I), and agricultural. M&I use constitutes about 80 to 85 percent of regional water consumption. Agricultural water, used mostly for irrigating groves and crops, accounts for the remaining 15 to 20 percent of demand. This section describes these use categories along with the total historic, current and projected water demands. By 2020 water demands are projected to reach 813,000 AF, which is approximately a 30 percent increase above the 1999 demand of 619,400 AF.

2.1 MUNICIPAL AND INDUSTRIAL WATER DEMAND

M&I demand can be subdivided into residential demand (water used for human consumption in the home, domestic purposes, and residential landscaping) and water used for commercial and industrial purposes.

2.1.1 Residential Demand

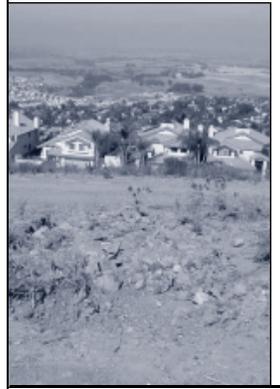
Residential water consumption is composed of both indoor and outdoor uses. Indoor water use includes sanitation, bathing, laundry, cooking, and drinking. Most outdoor water use is to meet landscaping irrigation requirements. Other minor outdoor uses include car washing, surface cleaning, and similar activities. For single-family homes and rural areas, outdoor demands may be as high as 60 percent of total residential use.

Based on SANDAG data, the San Diego regional housing stock composition in 1999 was approximately 59 percent single-family homes, 36 percent multi-family homes, and 5 percent mobile homes. Single-family residences generally contain larger landscaped areas, predominantly planted in turf, and require more water for outdoor application in comparison to other types of housing. The general characteristics of multi-family and mobile homes limit outdoor landscaping and water use, although some condominium and apartment developments do contain green belt areas.

2.1.2 Commercial and Industrial Demand

Commercial water demand consists of generally incidental uses but are necessary for the operation of a business or institution, such as drinking, sanitation, and landscape irrigation. Major commercial water users include service industries, such as restaurants, car washes, laundries, hotels, and golf courses. Economic indicators developed by the Greater San Diego Chamber of Commerce indicate that almost half of San Diego's residents are employed in commercial (trade and service) industries.

Industrial water consumption consists of a wide range of uses, including product processing and small-scale equipment cooling, sanitation, and air conditioning.





Water-intensive industrial uses in the City of San Diego, such as kelp processing, electronics manufacturing, and aerospace manufacturing, typically require smaller amounts of water when compared to other water-intensive industries found elsewhere in Southern California, such as petroleum refineries, smelters, chemical processors, and canneries.

The tourism industry in San Diego County affects water usage within the Authority's service area by not only the number of visitors, but also through expansion of service industries and attractions, which tend to be larger outdoor water users. Tourism is primarily concentrated in the summer months and affects seasonal demands and peaking. SANDAG regional population forecasts do not specifically account for tourism, but tourism is reflected in the economic forecasts and causes per capita use to increase.

2.2 AGRICULTURAL WATER DEMAND

The coastal and inland valley areas of the county possess a moderate and virtually frost-free climate able to support a variety of sub-tropical crops, making the San Diego area a unique agricultural region. The primary crops grown for the national and international markets are avocados, citrus, cut flowers, and nursery products. To a lesser extent, local fresh market crops and livestock are produced in the Authority's service area. In recent years, agriculture has accounted for 10 to 20 percent of the Authority's total water demand.

The Authority is the largest consumer of agricultural water within Metropolitan's service area, comprising over 60 percent of Metropolitan's total agricultural water demands each year. Agricultural water use within the Authority's service area is concentrated mainly in north county including member agencies such as: Rainbow, Valley Center, Ramona, and Yuima Municipal Water Districts, the Fallbrook Public Utility District, and the city of Escondido.

2.3 TOTAL CURRENT AND HISTORIC WATER USE

Water use in the San Diego area is closely linked to the local economy, population, and weather. Over the last half century a prosperous local economy has stimulated population growth, which in turn produced a relatively steady increase in water demand. However, fluctuating economic and weather conditions in the 1990s and lingering effects from the 1987-1992 drought resulted in deviations from historic demand patterns. By 1999 a new combination of natural population increase and job creation surfaced as the primary drivers of long-term water consumption increases.

Until FY2000, the peak year water demand in the Authority's service area occurred in 1990, when member agency use crested at 646,645 AF. The FY2000 demands did exceed the 1990 historic peak and reached an estimated total water use of 695,000 AF. Following the 1987-1992 drought, the Authority's service area experienced significant reductions in water use. This reduction in water use was attributable to several factors, including the economic recession, water conservation measures implemented by the Authority and its member agencies as a result of the 1987-92 drought, and relatively plentiful rainfall. From 1996 to 1999, yearly water demand remained fairly constant at the low 600,000 AF range, (excluding the 1998 decrease, due to extreme El Niño weather conditions), **Table 2-1** shows the historic water demand within the Authority's service area.

**TABLE 2-1
HISTORIC WATER DEMAND WITHIN
AUTHORITY SERVICE AREA
(1990-2000)**

YEAR	WATER USE (AF)
1990	646,645
1991	585,619
1992	503,210
1993	548,673
1994	536,907
1995	526,053
1996	615,900
1997	621,739
1998	562,225
1999	619,409
2000	695,000

Source: Authority Annual Reports

**FIGURE 2-1
CATEGORIES OF REGIONAL WATER DEMAND-1997**

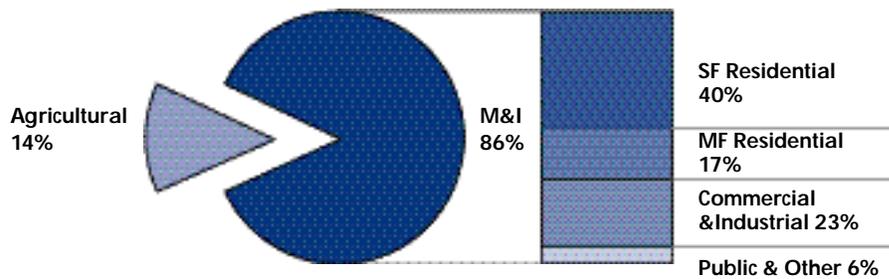


Figure 2-1 shows the relative percentages of various categories of water demand. In this figure, residential demand has been split between single-family residential (SF), and multi-family residential (MF). The "Public & Other" category includes water used for government and institutional purposes, as well as water system losses, including evaporation, meter losses (\pm errors), leaks, and seepage.

2.4 PROJECTED WATER DEMANDS

To forecast future M&I water use, the Authority selected the IWR-MAIN (Institute for Water Resources - Municipal And Industrial Needs) computer model. Versions of this econometric model have evolved over a 20-year period and are being used by many U.S. cities and water agencies. The IWR-MAIN system is designed to translate local demographic, housing, and business statistics into estimates of existing water demand and to utilize projections of local population, housing, and employment to forecast M&I water demand.

The Authority's version of the model, called "CWA-MAIN," utilizes demographic data from SANDAG. In 1992, the Authority and SANDAG entered into a memorandum of agreement (MOA) whereby the Authority agreed to use SANDAG's most recent regional growth forecasts for planning purposes. In addition, the MOA recognizes that water supply reliability must be a component of San Diego County's regional growth management strategy. As required in Proposition C, which was passed by the San Diego County voters in 1988, SANDAG has prepared a growth management strategy that includes a water supply element. The MOA ensures that the water demand projections for the San Diego region are linked with SANDAG's demographic projections and that water supply is a component of the overall regional growth management strategy.

In 1996, the Authority completed the development of a computer model that accounts for local demographic factors. M&I demands forecasted by the model served as the basis for the 1997 Water Resources Plan.

In 1999, the Authority modified the 1996 model to incorporate the latest member agency demographic projections from SANDAG and extend its forecast range from 2015 to 2020. The updated model incorporates SANDAG's 2020 Cities/County demographic forecast for member agencies through 2020.

Projecting future conservation is the last step in the development of the M&I forecast. The Authority developed the estimates of water savings based on implementation of the conservation Best Management Practices and SANDAG demographic information for the period 2000 through 2020. These savings are then used to adjust the baseline forecast.

The future water demands of the Camp Pendleton Military Reservation were forecasted by Camp Pendleton and included in the adjusted M&I forecast and agricultural forecast.

In addition to updating the CWA-MAIN model, a new agricultural water use model has also been developed. The new model estimates agricultural demand met by Authority’s member agencies based on agricultural acreage projections provided by SANDAG, crop distribution data derived from DWR and California Avocado Commission, and average watering requirements.

Table 2-2 shows the total projected water demand for the Authority through 2020. The baseline M&I demand forecast has been adjusted for the estimated water conservation, inclusion of Camp Pendleton demands, and the forecasted agricultural water use added to produce the total projected demand. Water conservation measures are expected to reduce total M&I demands by approximately 12 percent in 2020, with an estimated savings of 93,000 AF/YR. Agricultural demand will decrease about 17 percent over the 20 year period to an estimated demand of 91,500 AF.

**TABLE 2-2
NORMAL YEAR WATER USE FORECASTS
ADJUSTED FOR WATER CONSERVATION
(2005-2020)**

YEAR	M&I BASELINE FORECAST (AF)	ESTIMATED CONSERVATION SAVINGS (AF)	M&I FORECAST REDUCED BY CONSERVATION [†] (AF)	AGRICULTURAL FORECAST ^{‡§} (AF)	TOTAL PROJECTED DEMAND (AF)
2005	643,900	54,900	596,200	109,900	706,100
2010	693,600	74,400	628,100	105,200	733,300
2015	747,100	83,400	672,600	99,400	772,000
2020	805,800	93,200	721,500	91,500	813,000

Source: CWA-MAIN Forecast (July 2000)

[†] Includes M&I demands from Camp Pendleton Marine Corps Base (7,200 AF/YR in year 2005 and 8,900 AF/YR in years 2010, 2015 and 2020).

[‡] Includes non-certified IAWP agricultural water.

[§] Includes agricultural demands from Camp Pendleton Marine Corps Base (1,600 AF/YR in year 2005 and 2,300 AF/YR in years 2010, 2015 and 2020).

**FIGURE 2-2
REGIONAL HISTORIC AND PROJECTED
NORMAL WATER DEMANDS**

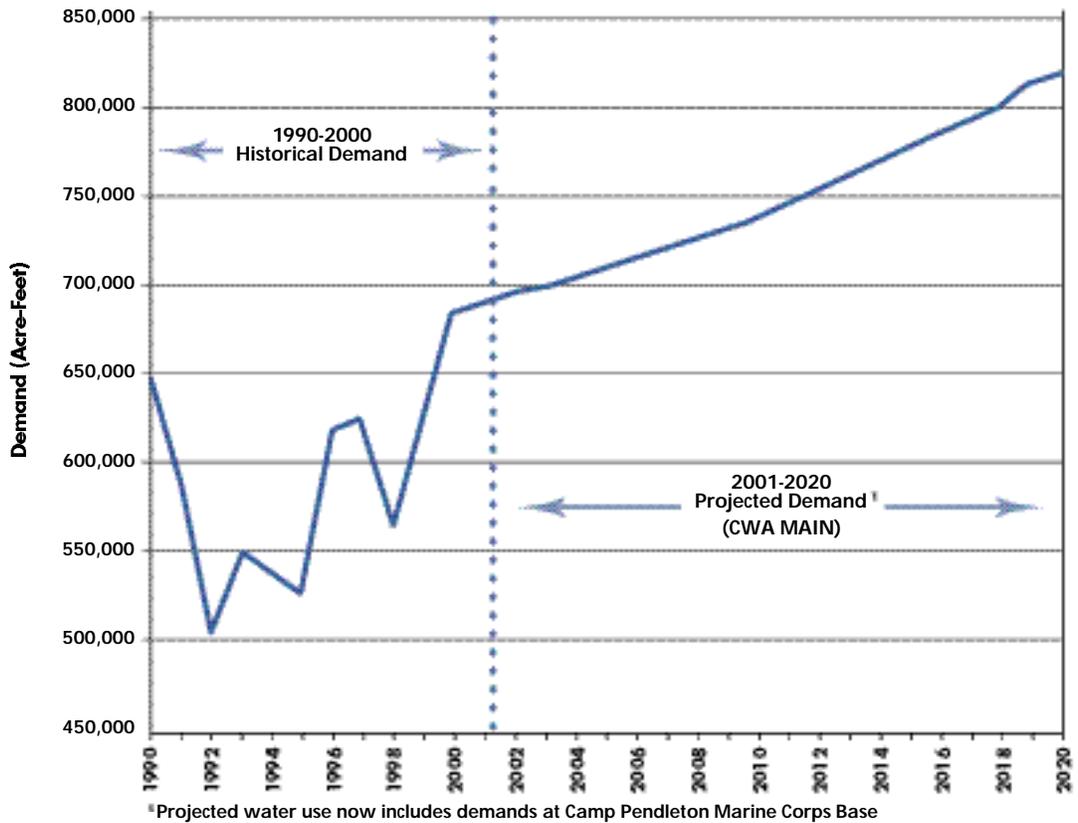
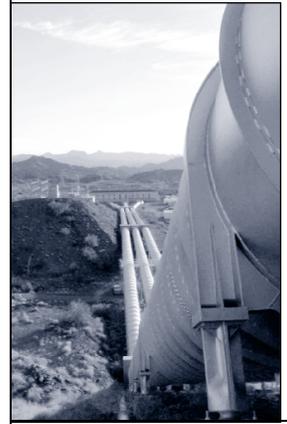


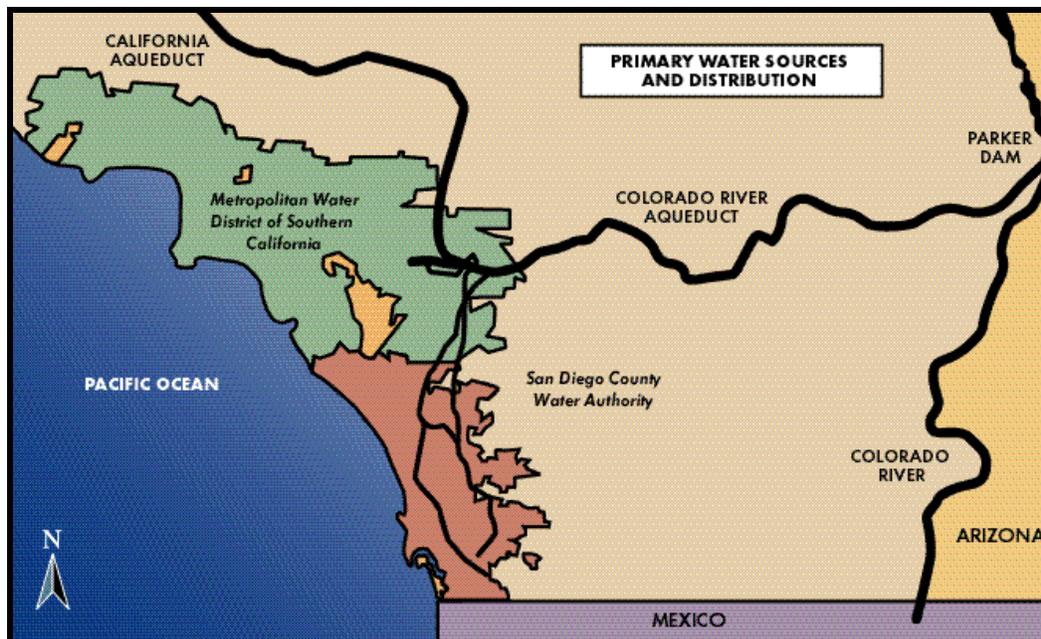
Figure 2-2 shows how water demand is projected to behave over the projected period of 2000 to 2020. This figure combines historical water use and the updated projected demands using the CWA-MAIN model and SANDAG 2020 Cities/County demographic and economic forecast data.

SECTION 3 – IMPORTED WATER SUPPLIES

As San Diego County has grown, so has the region's reliance on imported water supplies. Historically, the Authority has imported 75 to 95 percent of the region's water supply. In FY2000, the Authority supplied 83 percent of the water used in the region. Metropolitan is currently the sole source of imported water supply to the Authority. Metropolitan's ability to provide reliable supplies, particularly in a dry year, is constrained by the preferential right of each of its member agencies, as well as by current uncertainties regarding the continued reliability of the State Water Project and the Colorado River. Therefore, the Authority is taking steps to reduce dependence upon Metropolitan and diversify imported supplies. In April 1998, the Authority entered into an agreement with the Imperial Irrigation District (IID) for the transfer of 200,000 AF of conserved water as a major component of its diversification effort. The transfer is a cornerstone of the California Colorado River Water Use Plan. During the next five years, it is expected that the water transfer agreement with IID, along with other water transfers, will be implemented to increase the Authority's water supply reliability and reduce sole reliance on Metropolitan. This section describes the existing and anticipated future imported water supplies for the San Diego region.



**FIGURE 3-1
METROPOLITAN SERVICE AREA
INCLUDING SAN DIEGO COUNTY WATER AUTHORITY**



3.1 METROPOLITAN WATER DISTRICT

Formed in 1928 to develop, store, and distribute supplemental water in Southern California for domestic and municipal purposes, Metropolitan now supplies water to approximately 16 million people in a service area that includes portions of Ventura, Los Angeles, Orange, San Bernardino, Riverside, and San Diego counties. The Metropolitan service area, shown in **Figure 3-1**, covers a 70-mile-wide strip of the Southern California coastal plain, extending from the city of Oxnard on the north to the Mexican border. Close to half of the water used in this 5,200-square-mile region is supplied by Metropolitan, and about 90 percent of its population receives at least some of its water from Metropolitan. The extent to which Metropolitan's member agencies rely upon Metropolitan supplies varies. The ability of Metropolitan to provide supplies in a given year may depend upon the extent to which member agencies exercise their respective preferential right to purchase water.

The Authority, one of 27 Metropolitan member agencies, is the largest agency in terms of deliveries, purchasing about 30 percent of all the water Metropolitan delivered in FY1989-99. **Table 3-1** shows water use by Metropolitan's member agencies for fiscal year 1998-99 and preferential right to water based on 2.1 million acre-feet (MAF) of supply, which is what Metropolitan has represented as its firm supply. Metropolitan obtains its water from two sources: the Colorado River Aqueduct (CRA), which it owns and operates, and the State Water Project (SWP).

3.1.1 Colorado River

Metropolitan was formed to import water from the Colorado River. During the 1930s, Metropolitan built the Colorado River Aqueduct (CRA) to convey this water. The first deliveries were made to Metropolitan member agencies in 1941. The aqueduct is more than 240 miles long, beginning at Lake Havasu on the Arizona/California border and ending at Lake Mathews in Riverside County. The aqueduct has capacity to deliver up to 1.3 MAF each year. **Figure 3-1** shows the location of the aqueduct.

For many years, Metropolitan has chosen, for financial reasons, to minimize SWP deliveries to the Authority so that its water supply comes primarily from the Colorado River. Because the high salinity Colorado River water has been shown to cause extensive economic damage in San Diego County, the Authority has long sought to obtain its share of SWP supplies for which it pays Metropolitan. **Section 3.1.3** contains additional information on the issue of salinity in Metropolitan's supplies.

**TABLE 3-1
MWD 1998-99 WATER DELIVERIES AND LOCAL SUPPLIES (AF)**

MWD MEMBER AGENCIES	LOCAL WATER SUPPLY	MWD WATER DELIVERIES ¹	TOTAL WATER USE	PREFERENTIAL RIGHT TO MWD SUPPLY ²
Anaheim	59,531	15,238	74,769	16,380
Beverly Hills	0	13,545	13,545	21,420
Burbank	8,876	14,107	22,983	20,580
Calleguas M.W.D.	21,582	105,760	127,342	68,460
Central Basin M.W.D.	179,645	65,073	244,718	184,170
Coastal M.W.D.	19,863	27,579	47,442	50,400
Compton	4,914	4,734	9,648	5,880
Eastern M.W.D.	137,528	61,534	199,062	59,220
Foothill M.W.D.	8,367	8,824	17,191	14,490
Fullerton	24,751	6,431	31,182	12,810
Glendale	4,819	26,604	31,423	26,040
Inland Empire Utilities	169,323	48,629	217,952	49,980
Las Virgenes M.W.D.	3,798	19,413	23,211	13,440
Long Beach	27,911	44,857	72,768	58,170
Los Angeles	553,197	70,724	623,921	482,580
M.W.D. of Orange County	248,049	199,792	447,841	238,770
Pasadena	21,229	15,508	36,737	23,310
San Diego C.W.A.	150,173	454,436	604,609	302,190
San Fernando	3,481	0	3,481	2,520
San Marino	6,089	948	7,037	4,620
Santa Ana	36,962	12,436	49,398	15,330
Santa Monica	2,687	11,721	14,408	20,370
Three Valleys M.W.D.	66,590	62,410	129,000	48,930
Torrance	11,244	21,683	32,927	24,990
Upper San Gabriel Valley M.W.D.	170,191	7,131	177,322	93,450
West Basin M.W.D.	54,896	144,342	199,238	171,360
Western M.W.D.	193,397	70,194	263,591	70,560
TOTALS	2,189,093	1,533,653	3,722,746	2,100,000

Source: Metropolitan Water District

¹Includes MWD's replenishment deliveries.

²Member agencies' preferential right to Metropolitan supplies in FY98-99 based on 2.1 MAF, which is what Metropolitan has represented as its firm supply.

Reliability Issues

Before 1964, Metropolitan had a firm allocation of 1.212 MAF of Colorado River water through contracts with the U.S. Department of the Interior, which was enough to keep Metropolitan's aqueduct full. However, as a result of the U.S. Supreme Court decision in Arizona vs. California, Metropolitan's firm supply fell to 550,000 AF. In recent years, Metropolitan has kept its aqueduct full through access to unused apportionments from other states or declarations of surplus water from the Department of Interior. This reduction in firm allocation is the most pressing issue Metropolitan faces regarding its Colorado River supplies.

Water availability from the Colorado River is governed by a system of priorities and water rights that has been established over many years. The Colorado River Lower Basin states (California, Arizona, and Nevada) have an annual apportionment of 7.5 MAF of water. This supply is divided as follows: (1) California, 4.4 MAF; (2) Arizona, 2.8 MAF; and (3) Nevada, 300,000 AF. California agency priorities for water were established by the 1931 Seven Party Agreement. These priorities are shown in **Table 3-2**. As shown in the table, Metropolitan's 4th priority of 550,000 AF is junior to that of the first three priorities (3.85 MAF), which go to California agricultural agencies. Water used to satisfy priorities 5(a)-6(b) must come from unused allocations within California, Arizona, or Nevada or from surplus.

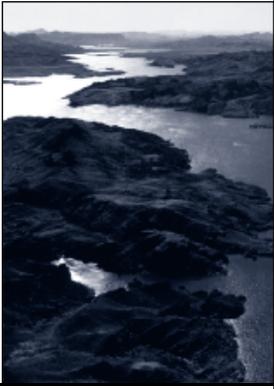
**TABLE 3-2
SEVEN PARTY AGREEMENT PRIORITIES**

PRIORITY	DESCRIPTION	AF/YR
1	Palo Verde Irrigation District	Priorities 1, 2, and 3 shall not exceed 3.85 MAF/YR
2	Yuma Project Reservation Division	Same as above
3 (a)	Imperial Irrigation District and lands in Imperial and Coachella valleys to be served by All-American Canal	Same as above
3 (b)	Palo Verde Irrigation District	Same as above
4	Metropolitan Water District	550,000
5 (a)	Metropolitan Water District	550,000
5 (b)	City/County of San Diego *	112,000
6 (a)	Imperial Irrigation District	
6 (b)	Palo Verde Irrigation District	300,000
	TOTAL	5,362,000

* In 1946 San Diego's rights were merged with and added to the rights of the Metropolitan Water District as one condition of the Authority's annexation to Metropolitan.

In recent years, Metropolitan has filled its aqueduct to capacity, using an average of 1.2 million acre-feet per year (MAF/YR) from the Colorado River. To do this, Metropolitan has relied on unused apportionments from Arizona and Nevada, unused apportionment from California agricultural agencies, and surplus water. But in recent years, Arizona and Nevada have increased water demand to near-apportionment levels, limiting the availability of unused apportionments to Metropolitan. Arizona's demand has been substantially increased by deliveries to an in-state groundwater banking program. Nevada is expected to begin banking water soon under an interstate water banking rule established by the Department of Interior in 1999, which allows Nevada to bank water in Arizona for Nevada's future use.

Metropolitan has been able to keep its aqueduct full in recent years through a successive string of annual surplus declarations by the Department of the Interior, beginning in 1996. Surplus water is also available for calendar year 2000. This has been made possible because above-normal precipitation has filled the river's



reservoirs to near-capacity. Without annual surplus declarations or revisions to the current surplus criteria, and absent any agreements to otherwise obtain Colorado River supplies, Metropolitan lacks the ability to maintain a full CRA.

Environmental Considerations In 1994, the U.S. Fish and Wildlife Service (USFWS) designated 1,980 miles of the Colorado River and its tributaries in Colorado, Utah, New Mexico, Arizona, California, and Nevada as critical habitat for four endangered species of native fish. In response to the 1994 designation, the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) was formed. The program is a partnership of federal agencies; state and local agencies in Arizona, California, including the Authority, and Nevada; Native American tribes; and other non-federal participants. The partnership is responding to the need to balance the legal use of lower Colorado River water resources and the conservation of threatened and endangered species and their habitats in compliance with the federal Endangered Species Act (ESA). To fulfill requirements of ESA, an Environmental Impact Statement/Environmental Impact Report (EIS/EIR) will be prepared that will evaluate the impacts associated with implementing the LCRMSCP. The LCRMSCP is currently in the scoping phase of project development and anticipates release of the draft EIS/EIR for public review by the first half of 2001. Until this effort is accomplished and a comprehensive plan for managing the river's resources is established, there will be some degree of uncertainty over the availability and costs of future river water supplies and power generation.

Current Supplies

Metropolitan currently has a firm supply comprised of two sources, its 4th priority of 550,000 AF, and the yield of a conservation program that Metropolitan completed with IID in 1988. This program currently yields about 106,000 AF, giving Metropolitan a total supply about 650,000 AF. Under certain conditions, however, Metropolitan must provide 50,000 AF of the conservation program water to the Coachella Valley Water District. Thus, Metropolitan's firm supply is now about 600,000 AF. The remaining 600,000 AF of water needed to fill the CRA must come from the unused apportionments of other states or from surplus water.

Future Supplies and California's Colorado River Use Plan

Metropolitan is working with other California agencies and other Colorado River Basin states to increase its river supplies and improve its water reliability. The primary vehicle for this effort is California's Colorado Water Use Plan (Water Use Plan), which is designed to reduce California's demand on the river to its 4.4 MAF apportionment when surplus water or other states' apportionment is not available. One element of the Water Use Plan would provide interim (through 2016) surplus guidelines for operating Lake Mead. The guidelines would provide Metropolitan additional surplus water while conservation and transfer programs are developed to reduce California demand. New water supply programs identified in the Water Use Plan include the Authority's

200,000 AF of water transfers with IID. In April 1998, the Authority entered into an agreement with IID for the transfer of conserved water. Deliveries into San Diego County from the transfer are expected to begin by 2002. The Authority will receive between 130,000 and 200,000 AF of water per year after an initial 10-year ramp-up in the water deliveries. (Refer to **Section 3.2** on IID water transfer.) Other supplies include about 93,700 AF from a conservation project to line the All American and Coachella Valley canals, located in Imperial and Coachella valleys, and several off-stream storage programs that would develop about 400,000 AF of dry-year supplies. These programs are intended to offset the reduced availability of unused apportionment and surplus water supplies.

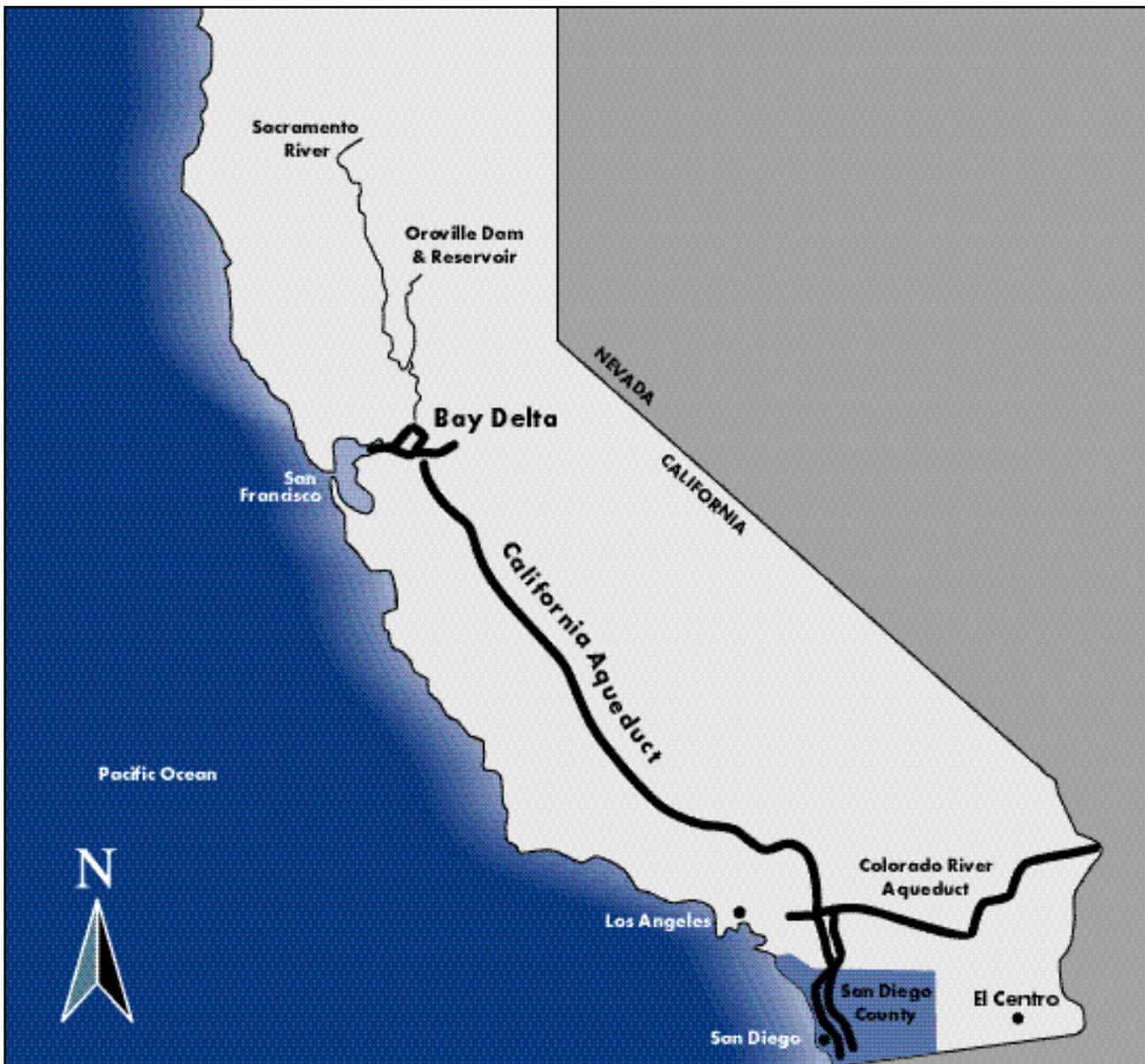
The Water Use Plan is being drafted by California agencies to incorporate the terms of a quantification settlement among Metropolitan and the state's agricultural agencies. This settlement sets limits to the amounts of water that each agricultural agency may take from the 3.85 MAF 1st priority described previously in this section. The settlement also provides for the allocation of future water supplies and transfers among California's river water users. The Water Use Plan is expected to be completed by early 2001. It must be accepted by the other Colorado River Basin states and approved by the Department of Interior.

The seven Colorado River Basin states have jointly proposed interim Lake Mead operating criteria. The Department of Interior has also begun a process to develop interim surplus operating criteria, and this year released a draft environmental impact statement comparing several criteria alternatives. The seven states' proposal will be reviewed as public comment on the EIS. All parties view the development of operating criteria as one of the key issues to be negotiated for a successful Water Use Plan.

3.1.2 State Water Project

Metropolitan's other water source, the SWP, is owned by the State of California and operated by the DWR. The project stretches more than 600 miles, from Lake Oroville in the north to Lake Perris in the south. Water is stored at Lake Oroville and released when needed into the Feather River, which flows into the Sacramento River and to the Sacramento-San Joaquin River Delta (Delta). In the north Delta, water is pumped into the North Bay Aqueduct for delivery to Napa and Solano counties. In the south Delta, SWP pumps lift water into the 444-mile-long California Aqueduct. Some water flows into the South Bay Aqueduct, to serve areas in Alameda and Santa Clara counties. The remainder flows southward to cities and farms in central and southern California. In the winter, when demands are lower, water is stored at the San Luis Reservoir located south of the Delta. The California Aqueduct is shown on **Figure 3-2**.

FIGURE 3-2
MAJOR WATER CONVEYANCE FACILITIES SERVING SAN DIEGO COUNTY



Reliability Issues

The reliability of SWP supplies is limited by both the level of SWP supply development compared to current and future demands and, increasingly, by pumping restrictions due to state and federal environmental regulations. The SWP was initially planned to deliver 4,230,000 AF to 32 contracting agencies. Subsequent contract amendments reduced total contracted deliveries to 4,172,786 AF and the number of contracting agencies to 29. Metropolitan's contracted entitlement is 2,011,500 AF or about 48 percent of the total. An important feature of the SWP contracts is that the full amount of water was not anticipated to be needed for at least the first 20 to 30 years of the project. Facilities needed to produce the full 4,230,000 AF were expected to be constructed over time as demands on the system increased. However,

as decisions on these additional facilities were repeatedly deferred, public attitudes and environmental regulations changed. New state and federal environmental laws put some potential water supply sources off limits to development. More stringent water quality standards adopted by the State Water Resources Control Board (SWRCB) to protect the San Francisco Bay/Sacramento-San Joaquin River Delta (Bay-Delta) have also reduced the amount of water available for diversion.

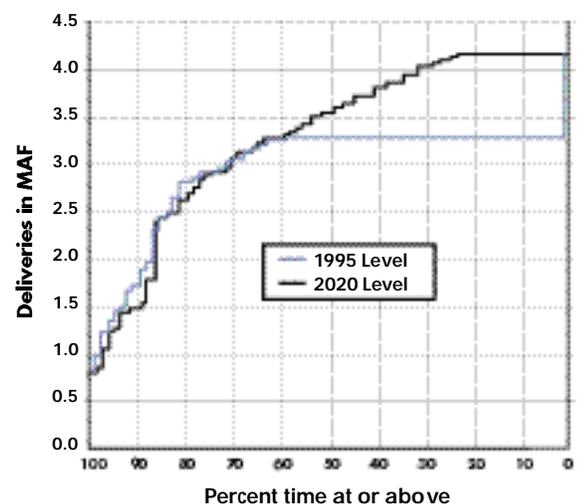
By the late 1980s, the SWP was unable to meet contractor demands during drought periods. During the initial years of the 1987 – 1992 drought, DWR maintained SWP deliveries using water stored at Lake Oroville and the San Luis Reservoir. In 1991, however, the SWP delivered only 549,113 AF of entitlement water. Of this amount, Metropolitan received 381,070 AF, or about 20 percent of its entitlement.

SWP shortages are expected to become more frequent as demands on the system increase. **Figure 3-3**, from DWR's Bulletin 160-98 shows existing (1995 demand level) and future (2020 demand level) SWP delivery capability, as estimated by operations studies, under the SWRCB's 1995 Water Quality Control Plan. According to Bulletin 160-98, existing SWP facilities have a 65 percent chance of making full deliveries under 1995 level demands and an 85 percent chance of delivering 2.0 MAF to contractors in any given year. Under a 2020 demand scenario, existing SWP facilities have a less than 25 percent chance of making full deliveries.

Environmental Considerations In recent years, actions taken to protect the ecosystem of the Bay-Delta have placed additional restrictions on SWP operations. The Bay-Delta is the largest estuary on the west coast and supports more than 750 plant and animal species. But 150 years of human activity, dating back to 19th century gold mining, has taken its toll on the Bay-Delta ecosystem and the fish that live there. In 1989, the winter-run Chinook salmon was designated, or "listed", as a threatened species under the federal Endangered Species Act (ESA). Over the next ten years, the Delta smelt, steelhead trout and spring-run Chinook salmon joined the list of threatened species and the winter-run Chinook salmon's population declined to such an extent that its status was changed to endangered.

The decline of Delta fisheries can be traced to numerous factors – habitat loss, water diversions, pollution, over-fishing, and the introduction of non-native species have all contributed to the degradation of the Bay-Delta ecosystem. Regulatory protection efforts have nevertheless tended to focus on the operations of the SWP and the federal Central Valley Project (CVP). In 1999, the SWP was forced to reduce pumping by about 500,000 AF to protect Delta smelt and spring-run Chinook salmon. These

**FIGURE 3-3
1995 AND 2020 STATE WATER
PROJECT DELIVERY
CAPABILITY WITH
EXISTING FACILITIES**





pumping reductions were in addition to fish protection measures built into the water quality standards established by the SWRCB. Although the SWP was able to offset some of the water supply impact by increasing pumping rates later in the year, SWP contractors lost access to more than 150,000 AF of water for storage and suffered a significant reduction in water quality.

Water Quality Considerations The quality of SWP water as a drinking water source is affected by a number of factors, most notably by seawater intrusion and agricultural drainage from peat soil islands in the Delta. SWP water contains relatively high levels of bromide and total organic carbon, two elements that are of particular concern to drinking water agencies. Bromide and total organic carbon combine with chemicals used in the water treatment process to form disinfection by-products that are strictly regulated under the federal Safe Drinking Water Act. Wastewater discharges from cities and towns surrounding the Delta also add salts and pathogens to Delta water, which reduce its suitability for drinking and recycling.

Water agencies treat all water to meet stringent state and federal drinking water standards before delivering it to customers. However, source water of poor quality will make it increasingly expensive and difficult to meet such standards. The California Urban Water Agencies (CUWA) retained the assistance of a panel of drinking water quality and treatment experts to evaluate the source water quality that would be needed to allow agencies treating Delta water to comply with future drinking water regulations under a plausibly conservative regulatory scenario. The expert panel identified target bromide and total organic carbon concentrations of 50 parts per billion (ppb) and 3 parts per million (ppm), respectively. By comparison, the average bromide concentration of SWP water is 290 ppb, about six times the target level. The average concentration of total organic carbon in SWP water is about 3.3 ppm, about ten percent above the target level.

Actions to protect Delta fisheries have exacerbated existing water quality problems by forcing the SWP to shift its diversions from the springtime to the fall, when salinity and bromide levels are higher. Closure of the Delta Cross Channel gates to protect migrating fish has also degraded SWP water quality by reducing the flow of higher quality Sacramento River water to the SWP pumps.

Current Supplies

SWP delivery contracts were amended in 1995 to reflect principles developed under the December 1994 Monterey Agreement. Under the Monterey amendments, all SWP supplies are allocated to contractors in proportion to their contractual entitlements. Metropolitan's approximately 48 percent share of total SWP contract entitle-

ments entitles it to a proportionate share of SWP supplies. Metropolitan estimates that existing SWP facilities, operated in accordance with the 1995 Water Quality Control Plan, will produce about 1.2 MAF in a dry year and 2.7 MAF a year on average. Metropolitan's proportionate share of dry year and average year SWP supplies is estimated at 0.6 MAF and 1.35 MAF, respectively.

The Monterey Agreement includes a number of other provisions, which allow for the improved management of SWP supplies. The agreement allows contractors to store SWP water outside their service areas for later use and provides contractors such as Metropolitan, that pay for terminal reservoirs, access to additional storage. Other provisions include the elimination of a permanent shortage provision that existed in the original SWP contracts, the transfer of Kern Water Bank lands to two contractors, and the sale of 130,000 AF of agricultural contractor entitlements to urban contractors. DWR's implementation of the Monterey Agreement has been challenged by the Planning and Conservation League and others. On September 15, 2000, the Third District Court of Appeal reversed a trial court ruling for DWR and ordered a new environmental impact report and a trial on the validity of the agreement. DWR has filed an appeal asking the California Supreme Court to review the appellate court decision.

Future Supplies and the CALFED Bay-Delta Program

Work being done by the CALFED Bay-Delta Program is expected to provide the greatest opportunity for SWP supply reliability and water quality improvements, though presently the outcome is uncertain. The state and federal governments organized the CALFED Program in 1995 to develop a comprehensive long-term solution to the ecosystem, levee stability, water quality and water supply reliability problems affecting the Bay-Delta system. The CALFED Program began its transition from planning to implementation in June 2000 with the release of a document entitled, *California's Water Future: A Framework for Action* (Framework). The Framework, which focuses on the first seven years ("Stage 1") of what CALFED envisions to be a 30-year program, outlines a number of specific steps to improve the quality and reliability of Bay-Delta water supplies, increase the efficient use of water throughout the state, restore the Bay-Delta ecosystem, stabilize Delta levees, and foster the water transfer market. The Framework was followed in July 2000 by a final programmatic environmental EIS/EIR that sets the stage for implementation of the CALFED Program. Three separate legal challenges were filed during the 30-day period following the certification of the EIS/EIR. It is not clear at this time what impact those legal challenges will have on the implementation of the CALFED Program.

The elements of the CALFED Program that have the greatest potential for increasing the reliability and quality of SWP supplies involve improvements to the existing Delta conveyance system, including expansion of the permitted capacity of the SWP pumping plant from its current level of 6,680 cfs to 8,500 cfs and ultimately to

10,300 cfs subject to certain conditions; and a new water "budget" for protection of fish known as the Environmental Water Account (EWA). The conveyance system improvements would improve the reliability and quality of SWP supplies by allowing the SWP to increase pumping during those times of the year when additional water is available and when water quality is highest, and reduce pumping when endangered fish are migrating through the Delta. The improvements will also increase the amount of pumping capacity available for other purposes, such as water transfers.

New surface and groundwater storage could also enhance the reliability and quality of SWP supplies. The CALFED Framework calls for the construction of up to 4.75 MAF of new surface and groundwater storage over the life of the CALFED Program; however, it is not known whether any of the new storage would be constructed as part of the SWP.

The amount of water produced through the proposed conveyance improvements will depend on how the individual facilities are operated and on the level of assurances provided by the state and federal regulatory agencies. The EWA, as proposed in the Framework, will be used to provide the SWP and CVP regulatory assurances for the first four years of the CALFED Program, with the expectation that the assurances will be extended periodically thereafter.

The regulatory assurances are intended to ensure that the projects will not face additional water supply impacts due to regulatory actions taken under the federal ESA or other federal or state laws or regulations. If CALFED succeeds in its mission of restoring stability to the Bay-Delta system, and the regulatory assurances are extended beyond the initial four-year period, then the improvements called for in the CALFED Framework have the potential to increase Metropolitan's share of average SWP supplies by about 0.15 MAF, to a total of 1.5 MAF. If CALFED is not successful, and the Bay-Delta system continues to decline, then the improvements proposed in the Framework may produce little or no supply reliability or water quality improvement and Metropolitan's SWP supplies could even decrease relative to existing levels.

3.1.3 Salinity Issues

The level of salinity can vary greatly between Metropolitan's two sources of imported water. Supplies from the CRA can reach 700 milligrams per liter (mg/l) total dissolved solids (TDS). By comparison, the SWP provides an average 250 mg/l from the East Branch and 325 mg/l from the West Branch (San Diego County is served from the East Branch of the State Project). Salinity control has long been an issue on the Colorado River. Agricultural development and water diversions over the past 50 years have increased the already high naturally occurring levels of TDS. High salinity levels can damage water delivery systems and home appliances and also cause problems for water recycling projects in the Authority's service area,



especially for marketing recycled water to agricultural users growing salt-sensitive crops. (Refer to **Section 4.3.2** for details on salinity impacts to water recycling.)

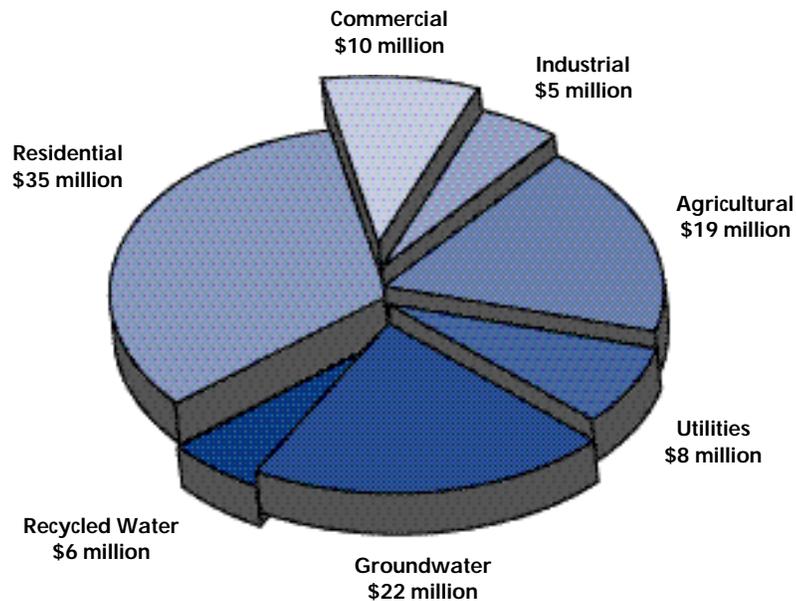
In recognition of the lower TDS offered by SWP supplies, the Metropolitan Act (Section 136) states that Metropolitan will deliver a 50/50 Colorado River/SWP blend to its member agencies, to the extent reasonable and practical. Metropolitan has for many years provided the Authority with predominately more saline Colorado River supply in order to reduce their operating costs. This has resulted in higher salinity water for the Authority and consequently in economic damages to the consumer. At the prompting of the Authority, Metropolitan instituted an interim blending policy in 1995 to provide the Authority a 25% blend of SPW during the heavy irrigation months of April through September. This blending policy was adopted in order to partially mitigate salinity impacts that were placing at risk millions of dollars in local water recycling investments. The salinity of imported water was resulting in a recycled water salinity that was in excess of what many of the recycled water customers could use for irrigation. However, this did not offset the economic damages that occurred during the remainder of the year to a much more widespread group of consumers. The Authority continued to be concerned over the high salinity of its supplies.

In June 1999 Metropolitan, in coordination with the U.S. Bureau of Reclamation (USBR), completed a Salinity Management Study (Study). The Study quantifies the impacts associated with high salinity water supplies and identifies an action plan to manage salinity concentrations in Southern California water supplies.

The Study determined that a 100 mg/l increase in imported water supplies within Metropolitan's service area will cause approximately \$105 million in economic damages annually. **Figure 3-4** provides a breakdown based on specific categories.

There are ten actions included in the Salinity Management Action Plan that focus on imported water source control, Metropolitan's distribution system, collaborative actions with other agencies and local salinity management actions. One of the actions includes establishment of a TDS concentration objective of 500 mg/l in Metropolitan's distribution system. Metropolitan can satisfy this target by blending its Colorado River supplies with increased deliveries of State Project water and meet the objective year-round. In the interim, if water resources are limited, Metropolitan has stated it would first focus on meeting the TDS target in the April-through-September period, which would provide some benefit of reduced salinity to peak irrigation customers and water recycling projects. Metropolitan has been able to maintain the 500 mg/l objective since initiation of the objective in April 1999. Although Metropolitan has adopted the 500 mg/l TDS objective, they will not provide a guaranteed blend of SWP and Colorado River supplies and therefore, improvements in the salinity of imported supplies remain uncertain. The Authority Board of Directors has considered obtaining additional imported supplies to improve salinity levels.

**FIGURE 3-4
ANNUAL DAMAGES OF 100 MG/L SALINITY INCREASE
IN IMPORTED WATER SUPPLIES WITHIN
METROPOLITAN SERVICE AREA (\$105 MILLION)**



3.1.4 Water Supply from Metropolitan

For many years, Metropolitan has been the sole provider of imported water to the Authority; however, circumstances have changed dramatically since the Authority joined Metropolitan in 1944. Today, the Authority is in the process of negotiations with Metropolitan to determine the nature and extent of their future relationship. Among the key issues to be addressed are:

- 1 **Preferential rights:** Under Section 135 of the Metropolitan Act, each member agency has a preferential right to water. This right is determined by each agency's total historic payments to Metropolitan from property taxes, stand-by charges, readiness-to-serve charges and other revenue, excluding revenue from the purchase of water even though a portion of such revenues are used to pay for capital projects. At any time under preferential rights rules, Metropolitan could allocate water without regard to historic water use or dependence on Metropolitan. This could leave the Authority short by more than half of its water supply in a hypothetical 20 percent shortage.

While there are a variety of legal opinions stating different interpretations of Section 135, it remains a cloud on the reliability of a significant portion of San Diego's water supply, which is in excess of its preferential rights. The Authority believes that Metropolitan should take the steps necessary to eliminate the conflict that surrounds Section 135 by either taking steps to remove it, or, by accepting it and requiring the

agencies who benefit from Section 135 to match the rights they claim with a proportionate share of the liabilities Metropolitan has incurred and continues to incur to satisfy those claims.

- 2 *Cost of service:* The Authority believes that there must be a nexus between benefits and burdens at Metropolitan and that the Authority and all of Metropolitan's member agencies should get what they pay for and pay for what they get. The Authority believes that Metropolitan must levy a charge for unused capacity and water held ready to serve member agencies on a standby basis; currently, Metropolitan shifts those costs to the member agencies who are buying water.
- 3 *Future investments:* The Authority has proposed that Metropolitan should only make investments that its member agencies are willing to pay for; the Authority believes that Metropolitan must change its current rate structure, which allows member agencies to "roll off" its system, thus shifting the burdens of its investments to those who remain.
- 4 *Establishment of rights and liabilities:* The Authority believes that Metropolitan's member agencies must, by contract or otherwise, be able to ascertain and fix their rights and liabilities in the Metropolitan system.
- 5 *Governance and voting:* The current voting structure at Metropolitan, like the preferential rights formula, is based on assessed valuation. While the system may have made sense when Metropolitan revenues were collected from taxes, it no longer makes sense when the majority of revenues are collected from water rates. The Authority believes that Metropolitan's governance and voting structure should be changed to reflect the interests of those member agencies who are paying the bills.
- 6 *Water quality:* As noted earlier, the Authority pays for but is not served water from the SWP that could bring its water quality up to the standards required by Section 136 of the Metropolitan Act. It is unfair for the Authority to be charged by Metropolitan for water it refuses to serve to the Authority; at a minimum, a price adjustment should be implemented.

The Authority is committed to taking all steps necessary to resolve these critical issues with Metropolitan; it has made a proposal to firm up its right to water, and it is seeking changes both within and outside of Metropolitan. Until the preferential rights issue is resolved, the Authority must assume for planning purposes that its firm water supply from Metropolitan is limited to 303,630 AF, representing its existing preferential right to water under the Metropolitan Act.



3.2 AUTHORITY-IID WATER TRANSFER

Water transfers have emerged as one of the Authority's greatest potential resources for meeting future demands. Water transfers are typically defined as the purchase of water during a specified period from an agency or district that then reduces its water use by that amount. In 1998, the Authority signed a historic agreement with the IID for the long-term transfer of conserved Colorado River water to San Diego County. The Authority-IID Water Conservation and Transfer Agreement will increase the reliability of the Authority's future imported water supplies.

3.2.1 The Authority-IID Water Conservation and Transfer Agreement

On April 29, 1998, the Authority and IID signed a Water Conservation and Transfer Agreement. The agreement is the largest agriculture-to-urban water transfer in United States history. Colorado River water will be conserved by Imperial Valley farmers who voluntarily participate in the program and then transferred to the Authority for use in San Diego County. Imperial Valley farmers will conserve the water by employing extra-ordinary conservation measures. Deliveries into San Diego County from the transfer are expected to begin by 2002. The Authority will receive between 130,000 and 200,000 AF/YR after an initial 10-year ramp-up in the water deliveries.

The initial term of the agreement is for 45 years, with a provision that either agency may extend the agreement for an additional 30-year term. Under certain conditions, up to 34,000 AF can be recalled by IID at the end of the initial 45-year term.

In the contract's first year, the price for the transfer water will be approximately \$250/AF. The price will be indexed to the Metropolitan rate at a discount. The discount is 25 percent for the first year, declining to a long-term value of five percent by year 17. The agreement allows for a "price redetermination" process to adjust the price to market values 10 years after the start of deliveries.

During dry years, when water availability is low, the conserved water will be transferred under IID's Colorado River rights, which are among the most senior in the Lower Colorado River Basin. Without the protection of these rights, the Authority could suffer delivery cutbacks. In recognition for the value of such reliability, the contract requires the Authority to pay a premium on transfer water under defined regional shortage circumstances.

Before the transfer can be implemented, the Authority and IID must resolve a number of contingencies. These contingencies are included in **Table 3-3** along with the status and estimated completion date.

**TABLE 3-3
STATUS OF CONTINGENCIES ASSOCIATED WITH
AUTHORITY-IID AGREEMENT**

CONTINGENCY	STATUS	DATE COMPLETE
Secure transportation of transfer water to San Diego County.	The Authority and Metropolitan signed a water exchange agreement to allow delivery of transfer water through the CRA.	November 1998
Both agencies must complete required review and assessments of any potential environmental impacts of the water transfer.	A full environmental impact review is under way by the IID, the Authority, and USBR to assess any potential environmental impact associated with the agreement.	The EIR/EIS should be finalized and the environmental process completed by early 2001.
The two agencies must receive approval of the agreement from the appropriate state and federal authorities.	The Authority and the IID filed a petition for approval with the SWRCB on July 22, 1998.	SWRCB approval is expected by early to mid 2001.
IID must reach voluntary agreements with Imperial Valley landowners to conserve at least 130,000 AF/YR for transfer.	IID notified the Authority that it had potential interest from landowners and tenants in conserving at least 134,000 AF of water. Additional landowners may participate upon completion of the environmental studies and development of on-farm guidelines for conservation.	October 1999

Future Supplies

Based on the Authority-IID transfer agreement, the anticipated delivery schedule is shown in **Table 3-4** in five-year increments.

**TABLE 3-4
PROJECTED IID TRANSFER SUPPLY¹
(AF/YR)**

2005	2010	2015	2020
80,000	180,000	200,000	200,000

¹ Assumes transfers begin in year 2002 at 20,000 AF and ramp-up in 20,000 AF increments each year.

3.2.2 The Authority-Metropolitan Water Exchange Agreement

A contingency of the transfer agreement is securing transportation of the water from the Colorado River to San Diego County. To satisfy this contingency, the Authority entered into a water exchange agreement with Metropolitan on November 1998. Under the exchange agreement, Metropolitan will take delivery of the transfer water through its CRA. The Authority will pay Metropolitan a delivery fee. In exchange, Metropolitan will deliver to the Authority a like quantity and quality of water. The duration of the agreement is 30 years.

The exchange agreement calls for the Authority to pay Metropolitan a per-acre-foot delivery fee of \$90 in the first 20 years, and \$80/AF from years 21 through 30. Both figures would escalate each year based upon an agreed-to rate of 1.55 percent for the first 20 years and 1.44 percent for the final 10 years of the agreement. The financial terms of the agreement could be adjusted in the 10th and 20th years to address impacts of potential catastrophes and changes in regulatory requirements.

In addition to the contingencies of the Authority-IID agreement, there are conditions associated with the Authority-Metropolitan agreement that will need to be satisfied before deliveries can be made. **Table 3-5** shows the conditions along with status and estimated completion date.

3.2.3 Regional Colorado River Conveyance Feasibility Study

The exchange agreement with Metropolitan allows the Authority to terminate the agreement if alternative conveyance facilities are developed. The Regional Colorado River Conveyance Feasibility Study (Regional Study) will provide a comprehensive feasibility level evaluation of the opportunities for a separate conveyance system that could transport and store conserved Colorado River water for San Diego County. The State of California will provide \$2.5 million of the Regional Study's cost from Proposition 204. The Authority will contribute \$500,000 towards preparation of the Regional Study.

**TABLE 3-5
STATUS OF CONDITIONS ASSOCIATED WITH
AUTHORITY-METROPOLITAN AGREEMENT**

CONDITIONS	STATUS	DATE COMPLETE
Quantification of the agricultural agencies' entitlements within their 3.85 million AF apportionment of Colorado River Water.	In October 1999, the state of California, IID, Coachella Valley WD, and Metropolitan reached agreement on the terms of a quantification settlement. This settlement sets limits to the amounts of water that each agricultural agency may take from the 3.85 MAF 1st priority shown in Table 3-2. The settlement also provides for the allocation of future water supplies and transfers among California's river water users. A series of agreements and contracts must be developed and executed before the quantification settlement takes effect.	Approval of the settlement by the Department of Interior is expected by early to mid 2001.
Development by the federal government of surplus criteria on the Colorado River to help assure a full Colorado River Aqueduct for Metropolitan at least through 2015.	The Department of Interior released a draft EIS in July 2000 comparing several surplus operating criteria alternatives. The seven basin states have since reached agreement on surplus criteria guidelines and the DOI has accepted the proposal as public comment on the draft EIS.	Early 2001
State funding must be allocated for the lining of the All-American Canal and its Coachella branch and for construction of conjunctive use storage facilities along the CRA.	A California law passed, providing \$235 million in state funding for the canal lining and storage projects.	September 1998

In addition, Proposition 13, passed by the voters in March 2000, allocates \$3 million to the Authority for environmental and engineering studies associated with a San Diego regional conveyance facility. Pending approval by the State, a portion of these funds will be used for the existing effort and remainder to be utilized for further studies, if necessary, upon completion of the Regional Study.

The Regional Study is separated into two components: 1) refinement of costs for alignments in the United States; and 2) evaluation of options from a binational perspective, which includes evaluating alignments in Mexico or partly in each country.

The first component of the Regional Study will include a refinement of the cost estimates for conveyance alignments in the United States that were provided in the September 1996 Feasibility Report for Facilities to Transfer Water from the Imperial Irrigation District. The cost includes pipelines, tunnels, power generation and pumping facilities, water storage, and water treatment. Annual operations and maintenance costs are projected to be about \$73 million. The costs included in the report contained contingencies of 25 to 50 percent due mainly to unknown geologic

conditions for tunneling and pipeline alignments. The refined cost estimates should be available by the end of year 2000.

The second component of the Regional Study, which will occur concurrently with the first element, is to conduct a joint feasibility level study with Mexico to evaluate conveyance and storage options that could benefit both regions. The Regional Study will be the first comprehensive evaluation of a potential binational conveyance system to transport and store Colorado River water. At this point, neither country is committing to go beyond the feasibility stage of the Regional Study. In defining the parameters of the Regional Study, the participating agencies also agreed that each country would transport water it owns in any future aqueduct. Technical data from the Regional Study will help the Authority determine whether a binational aqueduct could deliver transferred water efficiently and cost-effectively.

In October 1999, the International Boundary and Water Commission (IBWC) Minute 301 was approved, authorizing the two countries to work together on the Regional Study. Minute 301 also authorized formation of a Binational Technical Committee (BTC) to oversee preparation of the Regional Study. The binational component of the Regional Study should be completed in year 2001.

3.3 OTHER COMPETITIVE IMPORTED WATER SOURCES

Supplies from the IID water transfer and the Authority's preferential rights from Metropolitan are not sufficient to meet the imported water needs of the region. Therefore, the Authority must pursue additional supplies, either local and/or imported. Potential imported sources include various types of water transfers and/or Metropolitan non-firm supplies that may be available to the Authority.

3.3.1 Other Transfers

There is the potential to obtain additional transfer supplies, beyond the IID transfer, to meet the future demands of the San Diego region. There are various types of transfers available that are typically categorized into the following types:

- Core Transfers - Core transfers make water available through multi-year contracts that convey a specific amount of water to the purchaser each year. The IID water transfer is defined as a core transfer.
- Spot Transfers - Spot transfers make water available for a limited duration (typically one year or less) through a contract entered into in the same year that the water is delivered.
- Option Transfers - Option transfers are multi-year contracts that allow the purchaser to obtain a specified quantity of water at some future date. They usually require a minimum payment for water even if the water is not needed. For

example, an agreement may require water to be purchased one out of every five years.

- Storage Transfers - Storage transfers allow the purchaser to place water into storage for delivery at some time in the future.
- Water Exchanges - Water exchanges are agreements between the purchasing agency and selling agency that allow for the exchange of water from one source for water from a different source.

The IID transfer supply is conserved water from the Colorado River. The other two geographic regions where transfer water is currently available are central and northern California. Transfers from northern and central California would utilize SWP conveyance capacity. One example for how such transfers could be made available is the State Water Bank created during the end of the recent drought. In 1991, as a drought emergency measure, DWR created the bank to enable water-short districts and agencies to purchase supplies from willing water sellers. DWR purchased the water supplies primarily from northern California agricultural entities and sold these supplies to entities experiencing drought shortages. DWR purchased the water for \$125/AF and sold it for \$175/AF (1991 costs). Metropolitan purchased 215,000 AF in 1991; the Authority, due to cutbacks in supply from Metropolitan, had to separately purchase 21,600 AF through Metropolitan.

Under the recently adopted CALFED Bay-Delta Framework, described in **Section 3.1.2**, a Water Transfers Program will be initiated whose goal is to, "encourage the development of a more effective water transfer market that facilitates water transfers and streamlines the approval process while protecting water rights, environmental conditions, and local economic interests." This effort will assist agencies, such as the Authority, in implementing water transfers from northern and central California.

Additional transfer supplies for the San Diego region would not only help meet demands but could also provide lower salinity water for purposes of blending with IID transfer water. Water lower in TDS is required to blend with the higher TDS Colorado River water that will be supplied by IID in order to achieve a lower overall TDS in the Authority's supplies.

In 1998, the Authority's Board of Directors authorized staff to prepare and distribute a request for proposal for additional transfers. The Authority has explored and will continue to explore transfer and water storage opportunities throughout California that have the potential to provide a reliable imported water supply to help meet the Authority's supplemental water needs. However, all such programs are dependent on obtaining access to the water conveyance facilities operated by Metropolitan. The Authority is taking all steps necessary to obtain access to those facilities on a fair and equitable basis including, but not limited to, seeking review of the wheeling



statutes by the California Supreme Court in Metropolitan Water District of Southern California vs. Imperial Irrigation District, et al., S089760.

3.3.2 Non-firm Supplies from Metropolitan

In addition to transfers supplies, other imported supplies from Metropolitan may be available to the Authority. This water is considered a non-firm supply because it would be subject to call by other Metropolitan agencies having a preferential right to such supplies. In addition,

Metropolitan is in the process of formulating a new rate structure and it is unknown at this time what final rights and cost structure will emerge from this process.

3.4 SUMMARY OF IMPORTED WATER SUPPLIES

Table 3-6 shows the Authority's projected mix of future imported water supplies. In year 2000 imported deliveries will of necessity still be met by Metropolitan and equal an estimated 580,000 AF. The Authority's 2000 Plan is to pursue water transfers to help meet future demands and improve the water quality of the Authority's imported supplies, to the extent that these needs cannot be satisfied from the development and enhancement of local water supplies (Refer to **Section 4**). Staff will conduct an ongoing evaluation of the most advantageous mix of supplies to best meet future water supply needs. A critical but unknown factor as of the date of this 2000 Plan is the outcome of the key issues pending at Metropolitan (Refer to **Section 3.1.4**).

**TABLE 3-6
PROJECTED IMPORTED WATER SUPPLIES
(AF/ YR)**

	2005	2010	2015	2020
IID Water Transfer	80,000	180,000	200,000	200,000
Firm Supply from Metropolitan ^a	303,630	303,630	303,630	303,630
Other Competitive Imported Sources	172,370	65,470	73,470	85,870
TOTAL IMPORTED SUPPLIES	556,000	549,100	577,100	589,500

^a Firm supply from Metropolitan is based on the Authority's existing preferential right at Metropolitan.

SECTION 5 – WATER SUPPLY RELIABILITY

As stated in the Act, every urban water supplier shall include, as part of its plan, an assessment of the reliability of its water supply. The water supply and demand assessment must compare the total projected water use with the expected water supply over the next 20 years in five-year increments. The Act also requires an assessment for a single dry year and multiple dry water years. This section presents a summary of the water demands and supplies within the Authority's service area along with the reliability assessment.

5.1 DEVELOPMENT OF PROJECTED WATER RESOURCES MIX

In summary, development of the projected mix of resources to meet future supplies was based on the following factors:

- Update of the Authority's 1997 Water Resources Plan to reflect current conditions
- Local agency input into future projected water recycling and groundwater supplies
- Authority staff technical evaluations of potential new supplies (i.e., seawater desalination)
- Previous actions taken by the Board of Directors regarding imported supplies (discussed in **Section 3**):
 - Authority/IID Conservation and Transfer Agreement
 - Authority/Metropolitan Exchange Agreement
 - Direction to diversify supplies
 - Direction to address Metropolitan issues discussed in **Section 3.1.4**
 - Framework of Key Contract Terms Authority/Metropolitan

Refer to previous sections in this plan for detailed information on derivation of the projected local and imported water supplies contained in the proposed resource mix.

The Act requires that for any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climactic factors, that the agency describe plans to replace that source with alternative sources or water demand management measures. The Authority recognizes the uncertainties regarding imported water supplies from Metropolitan (**Section 3.1.4**) and as stated throughout the 2000 Plan, the Authority is taking steps to reduce dependence on this supply through water transfers and development of local projects (including demand management). The Authority's success in achieving imported water supply reliability depends, in part, on the implementation of the California Colorado River Water Use Plan, legislative efforts to further facilitate water transfers, and the establishment of fair charges for the movement of water through available capacity in existing Metropolitan conveyance facilities. The Authority intends to continue to



actively implement water conservation BMPs within its service area and to pursue other opportunities to secure reliable imported water supplies.

5.2 AVERAGE/NORMAL WATER YEAR ASSESSMENT

Table 5-1 shows the average/normal year assessment, summarizing the total water demands for the Authority through the year 2020 along with the supplies to meet demands. If projected imported and local supplies are developed as indicated, no shortages are anticipated within the Authority's service area in an average year through 2020. The average year demands within the Authority's service area are discussed in **Section 2**. Imported supplies and local supplies are described in **Section 3** and **Section 4**, respectively.

**TABLE 5-1
AVERAGE/NORMAL WATER YEAR SUPPLY
AND DEMAND ASSESSMENT
(AF/YR)**

LOCAL SUPPLIES	2005	2010	2015	2020
Surface Water	85,600	85,600	85,600	85,600
Water Recycling	33,400	45,100	51,800	53,400
Groundwater	31,100	53,500	57,500	59,500
Seawater Desalination	0	0	0	25,000
IMPORTED SUPPLIES				
IID Water Transfer	80,000	180,000	200,000	200,000
Firm Supply from Metropolitan ¹	303,630	303,630	303,630	303,630
Other Competitive Imported Sources	172,370	65,470	73,470	85,870
TOTAL PROJECTED SUPPLIES	706,100	733,300	772,000	813,000
TOTAL ESTIMATED DEMANDS	706,100	733,300	772,000	813,000
DIFFERENCE	0	0	0	0

¹ Firm supply from Metropolitan is based on the Authority's existing preferential right at Metropolitan.

5.3 DRY WATER YEAR ASSESSMENT

The dry year assessment is shown in **Table 5-2** and includes demands and supplies during a single and multiple dry water years. The Act requires an estimate of the minimum water supply available during each of the next three water years. Therefore the estimated demands and supplies for multiple dry years are reflective of years 2001, 2002 and 2003. The anticipated dry-year projected demands and supplies in year 2010 were utilized for the single dry-year analysis. The year 2010 is being utilized in order to show the results of local and imported water supply development over the next ten years.

**TABLE 5-2
DRY WATER YEAR SUPPLY AND DEMAND ASSESSMENT
(AF/YR)**

	Single Dry Water Year (2010)	Multiple Dry Years		
		Year 1 2001	Year 2 2002	Year 3 2003
LOCAL SUPPLIES				
Surface Water and Groundwater	38,100	40,100	38,100	53,500
Water Recycling	45,100	14,300	19,200	25,200
Groundwater Recovery	34,900	6,900	10,500	10,500
Seawater Desalination	0	0	0	0
IMPORTED SUPPLIES				
IID Water Transfer	180,000	0	20,000	40,000
Firm Supply from Metropolitan	303,630	303,630	303,630	303,630
Other Competitive Imported Sources *	185,870	341,870	328,270	299,870
TOTAL PROJECTED SUPPLIES	787,600	706,800	719,700	732,700
TOTAL ESTIMATED DRY YEAR DEMANDS	787,600	706,800	719,700	732,700
DIFFERENCE	0	0	0	0

*Metropolitan projects that it will have at least 2.1 MAF/YR of available dry-year supplies during this next 3-year period.

If projected imported and local supplies are developed as indicated, no shortages are anticipated within the Authority's service area in the dry-year scenarios analyzed. A more detailed discussion on the issues facing implementation of local supplies is contained in **Section 4**. The factors effecting reliability of imported supplies from Metropolitan and the Authority's efforts at securing other reliable sources of imported water through transfers is addressed in **Section 3**. The Authority's objective is to secure firm supplies to meet dry year demands. At this time we rely on a supply from Metropolitan which, for quantities above our preferential right, is not considered reliable. The Authority's planning direction is to work with our member agencies to increase reliable local supplies and to secure additional cost-competitive and reliable sources of imported supplies.

Studies have shown that hot, dry weather may generate urban water demands that are about 7 percent greater than normal and agricultural demands that are about 9 percent greater than normal. These percentages were utilized to generate the dry year demands shown in **Table 5-2**. No extraordinary conservation measures, beyond BMP implementation, are reflected in the demand projections.

The surface and groundwater supplies shown in **Table 5-2** are reflective of supplies available during the 1987-92 drought in years 1990, 1991 and 1992. The supplies available from recycling and groundwater recovery projects are assumed to experience little, if any, reduction in a dry-year. Therefore, estimated normal supply yields are included in the analysis.

As discussed in **Section 6.2.2**, the IID transfer supply is highly reliable in a dry-year scenario and therefore full deliveries are expected as shown in **Table 5-2**. The firm supply from Metropolitan is fixed at 303,630 AF, based on the Authority's existing preferential right to water from Metropolitan (Refer to **Section 3.1.4**).

The additional supplies necessary to meet future demands in dry-years will be obtained through development of additional transfers and purchase of other supplies from Metropolitan. Metropolitan projects that they will have at least 2.1 MAF/YR of dry-year supplies during the 3-year period analyzed in **Table 5-2**. This is contingent upon successful completion of California's Colorado Water Use Plan, as discussed in **Section 3.1.1**, which will enable Metropolitan to maintain a full CRA. However, the California Colorado Water Use Plan is not yet completed or fully funded; similarly, the outcome of the CALFED Framework remains uncertain (**Section 3.1.2**). Moreover, Metropolitan has not addressed key issues raised by the Authority, or produced a strategic plan or rate structure that would allow for a meaningful analysis of proposed Metropolitan water resources planning initiatives. The Authority is actively participating in each of these arenas and will make recommendations to the Authority Board of Directors when and as information is available to achieve the Authority's objective of reliability and cost certainty.

SECTION 6 - SHORTAGE CONTINGENCY ANALYSIS

The Act requires that urban water agencies conduct a water shortage contingency analysis as part of their 2000 plan. This section includes the Authority's analysis, which addresses a catastrophic shortage situation and drought management.

6.1 CATASTROPHIC WATER SHORTAGE

A catastrophic water shortage occurs when a disaster, such as an earthquake, results in insufficient water available to meet the region's needs or eliminates access to imported water supplies. The following is a description of the Authority's Emergency Response Plan (ERP) and Emergency Storage Project (ESP), both developed in order to protect public health and safety and to prevent or limit economic damage that could occur from a severe shortage of water supplies.

6.1.1 Emergency Response Plan

The purpose of the Authority's ERP is to provide staff with the information necessary to respond to an emergency situation that results in severe damage to the Authority's water distribution system or impedes the Authority's ability to provide reliable water service to its member agencies. The ERP describes the emergency situations and incidents that will trigger the activation of the Authority's ERP and Emergency Operations Center (EOC) in addition to providing direction and strategies for responding to a crisis situation. The Authority's ERP includes:

- Authorities, policies, and procedures associated with emergency response activities;
- EOC activities - including EOC activation and deactivation guidelines;
- Multi-agency and multi-jurisdictional coordination, particularly between the Authority, its member agencies, and Metropolitan in accordance with Standardized Emergency Management System (SEMS) guidelines;
- Emergency staffing, management, and organization required to assist in mitigating any significant emergency or disaster;
- Mutual Aid Agreements and Covenants which outline the terms and conditions under which mutual aid assistance will be provided;
- Pre-emergency planning as well as emergency operations procedures.

In addition, the Authority's ERP Manual uses a step-by-step approach to emergency response planning by providing such procedural tools as action checklists, resource and information lists, personnel rosters, and listings of established policies and procedures. The Authority's plan parallels many of the same plan components contained in the Unified San Diego County Emergency Services Organization's "Operational Area Emergency Plan" (OAEP). In turn, the OAEP serves to support and supplement the Authority's ERP.



6.1.2 Authority's Emergency Storage Project

In 1998 the Authority's Board approved implementation of the ESP, to reduce the risk of potentially catastrophic damages that could result from a prolonged interrup-



tion of imported water due to earthquake, drought or other disaster. As described in **Section 1.2.6**, the ESP is a system of reservoirs, pipelines and other facilities that will work together to store and move water around the county in the event of a natural disaster. The project will also provide an additional 90,100 AF of stored water. Combined with the storage space already dedicated to emergency use, the additional storage capacity is projected to meet the county's emergency needs through at least 2030.

In sizing the ESP, the Authority assumed a 75 percent level of service to all Authority member agencies during an outage and full implementation of the water conservation BMPs. The allocation of the ESP supplies to the Authority's member agencies in a prolonged outage situation without imported supplies is calculated as follows:

- 1 Estimate the duration of the emergency. (i.e., time to repair damaged pipeline(s)).
- 2 Calculate the total estimated annual M&I and agricultural water demand for each member agency for the duration of the emergency.
- 3 Determine demands at 75 percent level of service for M&I customers and 50 percent level of service for agricultural customers. (Agriculture has agreed to a reduction in deliveries at twice the rate of system-wide demands during an emergency in order to pay a reduced Special Agricultural Water Rate (SAWR) to the Authority.)
- 4 After determining the appropriate level of service demand for the agency, subtract the amount of water that the agency can self supply from local sources during the emergency up to a limit of four average months of demand. Local supplies include groundwater, recycled water and local surface water.
- 5 The remaining unmet demand is the agency's need for water from the ESP. This supply coupled with any local supplies, will maintain a 75 percent level of service to M&I customers in a catastrophic emergency.

Additionally, if there is extra water available in the ESP, from the reduced level of service provided to SAWR customers, such supplies are reallocated to commercial and industrial customers to limit economic damages during a catastrophic shortage situation. Construction has begun on Phase 1 of the ESP with completion of the entire project expected in 2010. Supplies from the ESP can also be utilized in a prolonged drought situation where imported and local supplies are not adequate to meet 75 percent of the Authority's member agencies M&I demands. In July 2000, the Authority Board adopted a Memorandum of Understanding regarding the ESP, which states that the Authority will develop a Water Shortage Management Plan for Authority water, including supplies from the ESP.



6.2 DROUGHT MANAGEMENT

6.2.1 Background – 1987-1992 Drought

The last major drought in California occurred between 1987 and 1992 and caused severe water supply shortages throughout the state. During early March 1991, at the peak of the drought, Metropolitan's SWP supplies were reduced by 90 percent. Subsequently, Metropolitan voted to impose a 50 percent reduction in imported deliveries to the Authority. The results of Metropolitan's cutback would have been devastating to the Authority's businesses and residents except for the miracle March rainfall that occurred later that month. These rains allowed the SWP to reduce its level of cutback to 80 percent, and Metropolitan later rolled back its call for reduction from 50 percent to 31 percent. Even at this level the Authority was impacted much more than other Metropolitan members, because of its high dependence upon imported supplies from Metropolitan. Other agencies with more local supplies, particularly groundwater agencies faced retail cutbacks of only 10 to 20 percent. Metropolitan had the ability to purchase additional supplies from the State Water Bank to reduce the Authority's level of shortage, but chose not to do so. The Authority purchased State Water Bank supplies at a cost of over \$8.5 million on its own behalf and this, coupled with maximizing local surface supplies kept retail cutback to the 20 percent level. This level of cutback lasted a year until in April 1992 when the level of reduction was reduced to a voluntary level of conservation.

In a water shortage emergency, it is reasonably likely that the Authority's Board of Directors would declare an emergency and allocate its water to meet requirements for human consumption, sanitation and fire protection. However, in addition to planning to meet such emergency needs at the time that such conditions might exist, the Board of Directors may also determine, as it did during the last drought, to adopt a drought plan that does not invoke Section 350 of the Water Code. Any such drought plan could take into account the differing needs of the Authority's member



agencies. Finally, the Authority, in cooperation and consultation with its member agencies, as water retailers, will be developing rules and regulations for water management and shortage allocation as authorized by the County Water Authority Act. This is discussed further in the following sections.

6.2.2 Plan for Diversifying Supplies

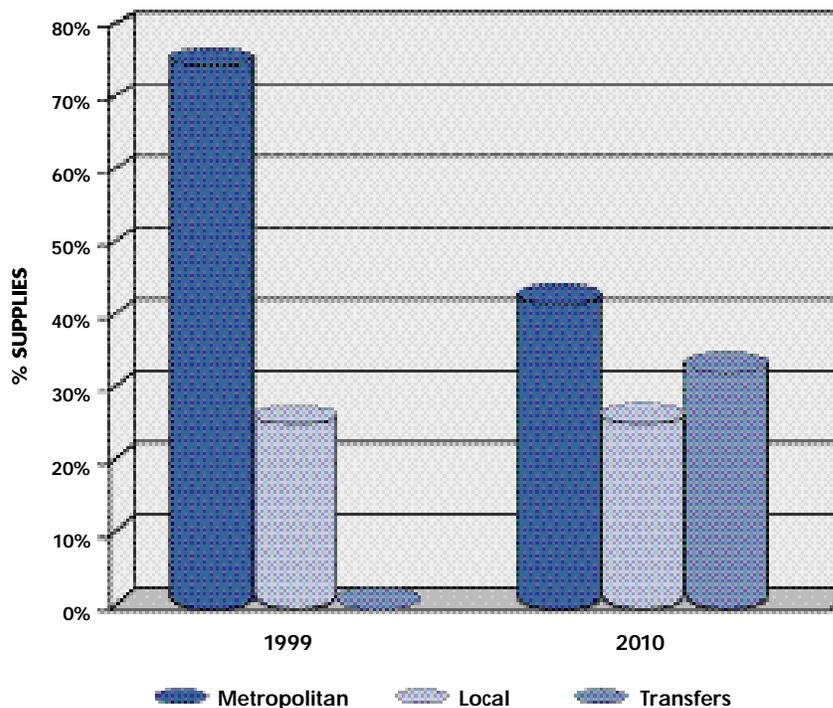
The Authority responded to the 1987-92 drought by developing a comprehensive plan to diversify the regions' water supply. A Water Resources Plan that assessed the availability of traditional local water supplies and identified major new water sources was developed in 1993 to guide the Authority's efforts to ensure a reliable water supply for the region. The plan, updated in 1997, describes the steps the Authority is taking to ensure San Diego County achieves a cost-effective, safe, reliable water supply mix through the year 2015. While recognizing that the Authority will continue to import the majority of its water supply from Metropolitan over the next few years, the plan supports diversification of the Authority's supplies, including, but not limited to, enhanced local water supply programs, core water transfers (such as the Authority/IID transfer of conserved water), other reliable transfers and additional programs to enhance the Authority's supply reliability. The Authority plans to assist and cooperate with its member agencies in the development of these diverse sources of supply.

Consistent with the direction provided in the 1997 plan, the Authority, in 1998, entered into a Water Conservation and Transfer Agreement with the IID, an agricultural district in neighboring Imperial County. As described in detail in **Section 3.2**, the 75-year term Agreement calls for up to 200,000 AF of Colorado River water to be conserved by Imperial Valley growers through the implementation of extraordinary conservation measures. The conserved water will be transferred to the Authority via Metropolitan's CRA, through terms established in a 1998 Contract for the Exchange of Water between the Authority and Metropolitan. This transfer supply will provide increased reliability for the region. During dry years, when water availability is low, the conserved water will be transferred under IID's Colorado River rights, which are among the most senior in the Lower Colorado River Basin. In addition, under the exchange agreement with Metropolitan, the Authority's water acquired from IID will be treated as independently owned local water in the same manner as independently owned local water supplies of other Metropolitan member agencies.

Water recycling projects also provide an excellent "drought-proof" supply of water that is available when other supplies may be reduced. Combining transfers, water recycling, groundwater supplies and potential seawater desalination, the region will have reduced dependence upon a single source and have a mix of supplies that will provide increased reliability in normal years and drought situations.

The graph shown in **Figure 6-1** illustrates how the Authority plans to diversify the regions supply and reduce dependence upon Metropolitan through the development of potential local supplies and water transfers.

**FIGURE 6-1
DIVERSIFICATION OF AUTHORITY'S SUPPLY CURRENT
AND PROJECTED SOURCES**



6.2.3 Metropolitan Water Surplus and Drought Management Plan

Over the next five to ten years, the Authority will continue to import the majority of its water supply from Metropolitan. Accordingly, the reliability of the Authority's water supply is subject to change at the discretion of the Metropolitan Board of Directors. The Authority's shortage contingency analysis for the 2000 Plan assumes that under Metropolitan's Water Surplus and Drought Management Plan (WSDM Plan), adopted by the Metropolitan Board of Directors in April 1999, remains unchanged. However, the Authority recognizes that Board actions at Metropolitan could change the terms of the WSDM Plan at anytime and therefore the WSDM Plan cannot be relied upon to ensure the reliability of Authority supplies.

Subject to the foregoing, the WSDM Plan states that in an extreme shortage situation, Metropolitan would implement an allocation plan. The WSDM Plan does not contain a methodology for allocating imported water supplies during an extreme drought situation. Metropolitan plans to adopt an allocation formula as part of the WSDM Plan following approval of a new rate structure in FY2001.

The Authority believes that Metropolitan cannot change Section 135 of Metropolitan's Act through the adoption of the WSDM plan or otherwise; and that Section 135 puts a cloud on the reliability of the Authority's water purchases in excess of its preferential right to water. While all parties appear to concur that water code Section 350 would override Section 135 in a situation in which Section 350 is invoked to protect public health and safety, the Authority believes Section 350 cannot be relied upon to validate any WSDM Plan allocation absent concurrence and a waiver by the member agencies who hold preferential rights, most notable the City of Los Angeles. The Authority has proposed the elimination of preferential rights at Metropolitan, but until the cloud of Section 135 is removed, the reliable supply of water the Authority can expect from Metropolitan in a shortage situation is the amount of the Authority's preferential right, which leaves the Authority's position in a shortage situation uncertain.

6.3 SUMMARY

The shortage contingency analysis included in this section demonstrates that the Authority and its member agencies, through the ERP and ESP, are taking actions to prepare for and appropriately handle a catastrophic interruption of water supplies. The analysis also describes actions being taken by the Authority to firm-up its supplies from Metropolitan to provide increased reliability in a drought and reduce if not eliminate shortages.

The Authority does not currently have a shortage allocation plan. The Authority's last allocation plan was adopted in 1994 (Ordinance 94-3) and expired on December 31, 1995. With the majority of supplies within the region still imported from Metropolitan, it is difficult for the Authority to adopt a comprehensive shortage allocation plan without knowing the amount of supplies that will be available from Metropolitan in a shortage situation. The Authority Board will develop a Water Shortage Management Plan that will include the appropriate elements outlined in the Act that are applicable to the Authority. The Authority anticipates adopting the WSMP in FY2002 and will include a shortage contingency plan in the 2005 update of the plan.